

WHAT IS CLAIMED IS:

1. A graphite-containing heat-resistant cast iron comprising 3.5-5.6% of Si and 1.2-15% of W on a weight basis, and having intermediate layers, in which W and Si are concentrated, in the boundaries of graphite particles and a matrix.
- 5 2. The heat-resistant cast iron according to claim 1, wherein a ratio (X_i/X_m) of the weight ratio X_i of W in said intermediate layers to the weight ratio X_m of W in said matrix is 5 or more.
3. The heat-resistant cast iron according to claim 1 or 2, wherein a ratio (Y_i/Y_m) of the weight ratio Y_i of Si in said intermediate layers to the weight
10 ratio Y_m of Si in said matrix is 1.5 or more.
4. The heat-resistant cast iron according to any one of claims 1-3, having a composition comprising, on a weight basis, 1.5-4.5% of C, 3.5-5.6% of Si, 3% or less of Mn, 1.2-15% of W, less than 0.5% of Ni, 0.3% or less of Cr, and 1.0% or less of a graphite-spheroidizing element, the balance being
15 substantially Fe and inevitable impurities.
5. The heat-resistant cast iron according to any one of claims 1-4, further comprising 0.003-0.02% by weight of S and 0.05% or less by weight of a rare earth element.
6. The heat-resistant cast iron according to any one of claims 1-5, comprising 0.005-0.2% by weight of Mg as a graphite-spheroidizing element.
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7. The heat-resistant cast iron according to any one of claims 1-6, wherein it meets $Si + (2/7) W \leq 8$ on a weight basis.
8. The heat-resistant cast iron according to any one of claims 1-7, further comprising 5.5% or less by weight of Mo.
- 25 9. The heat-resistant cast iron according to any one of claims 1-8, further comprising 6.5% or less by weight of Cu.
10. The heat-resistant cast iron according to any one of claims 1-9, further comprising 5% or less by weight of Co.
11. The heat-resistant cast iron according to any one of claims 1-10,

further comprising 1.0% or less by weight of Nb and/or 0.05% or less by weight of B.

12. The heat-resistant cast iron according to any one of claims 1-11, wherein the number of graphite particles having W-containing carbide particles in the boundaries with said matrix is 75% or more of the total number of graphite particles.

13. The heat-resistant cast iron according to any one of claims 1-12, wherein with respect to W-containing carbide particles on the surface of graphite particles exposed by etching, their number is $3 \times 10^5/\text{mm}^2$ or more per a unit area of graphite, and/or their area ratio is 1.8% or more.

14. The heat-resistant cast iron according to any one of claims 1-13, wherein its A_{C1} transformation point is 840°C or higher when measured from 30°C at a temperature-elevating speed of 3°C/minute.

15. The heat-resistant cast iron according to any one of claims 1-14, wherein its weight loss by oxidation is 60 mg/cm² or less when kept at 800°C for 200 hours in the air.

16. The heat-resistant cast iron according to any one of claims 1-15, wherein its thermal cracking life is 780 cycles or more in a thermal fatigue test, in which heating and cooling are conducted under the conditions of an upper-limit temperature of 840°C, a temperature amplitude of 690°C and a constraint ratio of 0.25.

17. An exhaust equipment member made of the heat-resistant cast iron recited in any one of claims 1-16.

18. The exhaust equipment member according to claim 17, wherein it is an exhaust manifold, a turbocharger housing, an exhaust manifold integral with a turbocharger housing, a catalyst case, an exhaust manifold integral with a catalyst case, or an exhaust outlet.

19. An exhaust equipment member used at temperatures exceeding 800°C, which is formed by a heat-resistant cast iron having a composition

comprising, on a weight basis, 1.5-4.5% of C, 3.5-5.6% of Si, 3% or less of Mn, 1.2-15% of W, less than 0.5% of Ni, 0.3% or less of Cr, and 1.0% or less of a graphite-spheroidizing element, $Si + (2/7) W \leq 8$, and the balance being substantially Fe and inevitable impurities, said heat-resistant cast iron having a structure comprising a matrix based on a ferrite phase in an as-cast state, in which graphite is crystallized, and intermediate layers, in which W and Si are concentrated, in the boundaries of said graphite particles and said matrix, whereby it has an A_{C1} transformation point of 840°C or higher when measured from 30°C at a temperature-elevating speed of 3°C/minute, and a thermal cracking life of 780 cycles or more in a thermal fatigue test, in which heating and cooling are conducted under the conditions of an upper-limit temperature of 840°C, a temperature amplitude of 690°C and a constraint ratio of 0.25.

20. The exhaust equipment member according to claim 19, wherein a ratio (X_i/X_m) of the weight ratio X_i of W in said intermediate layers to the weight ratio X_m of W in said matrix is 5 or more.

21. The exhaust equipment member according to claim 20, wherein said X_i/X_m is 10 or more.

22. The exhaust equipment member according to any one of claims 19-21, wherein a ratio (Y_i/Y_m) of the weight ratio Y_i of Si in said intermediate layers to the weight ratio Y_m of Si in said matrix is 1.5 or more.

23. The exhaust equipment member according to claim 22, wherein said Y_i/Y_m is 2.0 or more.

24. The exhaust equipment member according to any one of claims 19-23, wherein its weight loss by oxidation is 60 mg/cm² or less when kept at 800°C for 200 hours in the air.

25. The exhaust equipment member according to any one of claims 19-24, wherein said heat-resistant cast iron has a composition comprising, on a weight basis, 1.8-4.2% of C, 3.8-5.3% of Si, 1.5% or less of Mn, 1.5-10% of W, 0.3% or less of Ni, 0.3% or less of Cr, and 0.01-0.2% of a graphite-spheroidizing

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- element, $\text{Si} + (2/7) \text{W} \leq 8$, and the balance being substantially Fe and inevitable impurities.
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